



Huntington Power Plant

6 miles west of Huntington, Utah on Hwy. 31
P.O. Box 680
Huntington, Utah 84528

July 21, 2016

Mr. Bryce Bird, Director
Utah Department of Environmental Quality
Division of Air Quality
195 North 1950 West
P.O. Box 144820
Salt Lake City, UT 84114-4820

**RE: 2nd Quarter, 2016 Particulate Matter Compliance Test Report - 40 CFR 63 SubPart UUUUU,
Huntington Power Plant Unit 1 (Title V Permit #1501001004)**

Dear Mr. Bird,

In accordance with Title V Permit Condition II.B.3.f.1(b) and 40 CFR §63.10021(d) the Huntington Power Plant submits this 2nd Quarter 2016 Particulate Matter (PM) Compliance Test Report for Unit 1. 40 CFR §63.10031(f)(6) requires the submittal of compliance test results that were generated prior to April 16, 2017. This submittal is intended to satisfy the report submittal for Huntington Unit 1, and includes the portable document format (PDF) report that is submitted electronically via the Emissions Collection and Monitoring Plan System (ECMPS).

The summary results of the 2nd Quarter 2016 PM test results are:

Unit	Emission rate (lb/mmBtu)
1	0.006

I am authorized to make this submission on behalf of the owners and operators of the affected source or affected units for which the submission is made. I certify under penalty of law that I have personally examined, and am familiar with, the statements and information submitted in this document and all its attachments. Based on my inquiry of those individuals with primary responsibility for obtaining the information, I certify that the statements and information are to the best of my knowledge and belief true, accurate, and complete. I am aware that there are significant penalties for submitting false statements and information, or omitting statements and information, including the possibility of fine or imprisonment.

Should you have any questions regarding this information, please contact Richard Neilson, Huntington Power Plant Environmental Engineer at (435) 687-4334 or me at (435) 687-4211.

Sincerely,

Darrell Cunningham
Managing Director Huntington Plant
Responsible Official

Enclosures: Emissions Testing Report for PacifiCorp Huntington Unit 1 – Particulate Matter Compliance Testing

cc: David Barnhisel
Steve Jensen
Director, USEPA Region VIII, w/enclosures



Emissions Testing Report for PacifiCorp
Huntington Unit 1
Huntington, Utah

Particulate Matter Compliance Testing

40 CFR Part 63, Subpart UUUUU

Test Date: June 28th, 2016

Project Code PC16-0001.9

5160 Parfet Street
Suite A3
Wheat Ridge, CO 80033



Office (303) 495-3936
Toll Free (800) 984-9883
Fax (888) 605-0243
www.stacktest.us

Certification Statement

I certify that all field data were acquired under my direction in accordance with a system designed to assure data quality. Based on reasonable inquiry, the information submitted is to the best of my knowledge true, accurate and complete.

A handwritten signature in black ink, appearing to read "Andrew Bruning".

Andrew Bruning
Senior Project Manager
Emissions Measurement Company

I certify that this document and all attachments were prepared under my direction in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information submitted. Based on reasonable inquiry, the information submitted is to the best of my knowledge true, accurate and complete.

A handwritten signature in black ink, appearing to read "Matthew Parks".

Matthew Parks
Technical Director
Emissions Measurement Company

Executive Summary

EMCo was contracted by PacifiCorp to conduct compliance testing at the Huntington Power Plant near Huntington, Utah. Testing was performed to determine emission rates of particulate matter (PM) from the exhaust stack of Huntington Unit 1. Compliance test results are summarized in the table below; detailed test results are given in the following report.

PaciCorp Huntington Power Plant PM Compliance Test Results Summary						
Source	Parameter	Date	Average Value	Emission Limit		
Huntington Unit 1	Filterable Particulate Matter	6/28/2016	0.006	0.030 lb/mmBtu		
			0.07	0.30 lb/MW-hr		
Each result is the average of three two-hour test runs.						
<u>Abbreviations:</u> lb/mmBtu: pounds per million British thermal units lb/MW-hr: pounds per megawatt hour						

Introduction

EMCo was contracted by PacifiCorp to conduct source testing services at the Huntington Power Plant near Huntington, Utah. The Huntington Plant comprises two pulverized coal-fired boilers. Huntington Unit #1 is equipped with low-NO_x burners and overfire air for nitrogen oxides (NO_x) control, a flue gas desulfurization (FGD) scrubber for sulfur dioxide (SO₂) control and pulse-jet fabric filters for particulate matter (PM) control. Testing was conducted in accordance with the requirements of 40 CFR Part 63 Subpart UUUUU, National Emission Standards for Hazardous Air Pollutants (NESHAP): Coal- and Oil-Fired Electric Utility Steam Generating Units.

Contact information for the project is listed in the table below.

Contact	Affiliation	Telephone	E-mail
Frank Zampedri Environmental Analyst	PacifiCorp	(801) 220-2169	frank.zampedri@pacificorp.com
Richard Neilson Environmental Engineer		(435) 687-4334	richard.neilson@pacificorp.com
Rob Leishman Environmental Scientist	UDEQ	(801) 536-4438	rleishman@utah.gov
Andrew Bruning Senior Project Manager	EMCo	(303) 810-2168	abruning@stacktest.us

Scope of Work

Testing was performed to determine concentrations and mass emission rates of particulate matter (PM) for comparison to the applicable emission limits listed in the table below.

Source	Regulation	Parameter	Emission Limit
Huntington Unit 1	NESHAP UUUUU	PM (lb/mmBtu)	0.030 lb/mmBtu
		PM (lb/MW-hr)	0.30 lb/MW-hr
Abbreviations: lb/mmBtu: pounds per million British thermal units lb/MW-hr: pounds per megawatt-hour			

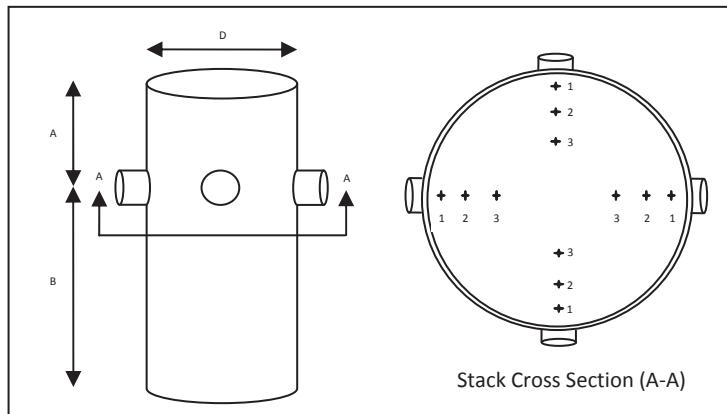
Testing Methods

EMCo used the following EPA Reference Methods for the testing program. No deviations from the Reference Methods were noted.

Parameter	EPA Reference Methods	Test Runs/Duration	Target Sample Volume
PM (lb/mmBtu)	1, 2, 3B, 4, 5*, 19	3 @ 2 hr	2 dscm (70.63 dscf)**
*In accordance with Table 5 of NESHAP Subpart UUUUU, the front-half temperature was set at 320° ± 25°F.			
**Sample volume from Table 2 of NESHAP Subpart UUUUU, doubled in accordance with §63.10005.			

Testing Location

The Huntington Unit #1 exhaust sampling location consists of a vertical, circular stack with four orthogonal sampling ports located at least six diameters downstream and two diameters upstream of the nearest flow disturbances. PM testing was performed across a grid of 12 points determined using EPA Method 1. See the schematic below.



Huntington Test Diagram	
Unit #	1
Diameter (D)	323.3"
Upstream Distance (A)	>220'
Downstream Distance (B)	>266'
Sample Point Distances from Stack Wall	
Traverse Point 1	14.1"
Traverse Point 2	47.3"
Traverse Point 3	95.7"

Test Results

The results of the testing program are given in the tables below. Detailed test results are located in Appendix A, along with sample calculations for all computed values.

PacificCorp Huntington Unit 1 PM Compliance Test Results Summary (6/28/2016)						
Parameter	Run #1	Run #2	Run #3	Average	QA Specification	Emission Limit***
Start Time	5:22	8:03	10:22	—	—	—
Stop Time	7:31	10:11	12:30	—	—	—
Sample Gas Volume (dscf)	80.52	81.06	80.33	80.64	>70.63*	—
Isokinetic Variation (%)	99.9	100.3	99.4	99.9	100 ± 10%	—
Filterable PM (lb/mmBtu)	0.010	0.006	0.003	0.006	—	0.030
Boiler Load (MW)	476	477	477	477	>468**	—
Filterable PM (lb/MW-hr)	0.11	0.06	0.03	0.07	—	0.30

* Sample volume from Table 2 of NESHAP Subpart UUUUUU, doubled in accordance with §63.10005.
**90% of design capacity, in accordance with §63.10007(a)(2).
***As shown, average PM emissions were less than 50% of the applicable emission limit, qualifying the unit for Low Emitting EGU (LEE) status.

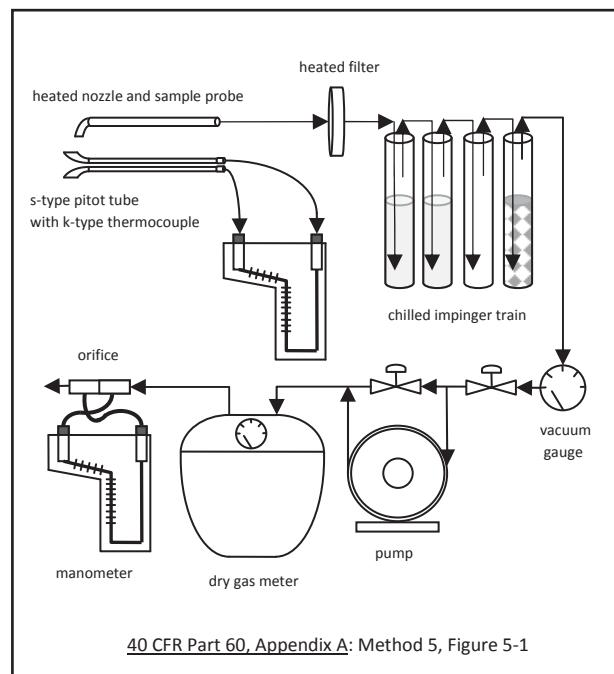
Testing Equipment

All testing equipment was housed in a climate-controlled mobile analytical laboratory designed and built by EMCo. All required quality assurance tests were performed as required by the applicable Reference Methods. Detailed equipment descriptions are given in the table below.

Parameter	Equipment	EPA Reference Method(s)
Particulate Matter (PM)	Heated probe with glass nozzle and stainless steel probe liner Quartz fiber filter S-type pitot tube K-type thermocouple Inclined-vertical manometer Dry gas meter Digital scale Analytical balance	1, 2, 3B, 4, 5B, 19

Test Details

Particulate matter testing was performed using EPA Methods 1, 2, 3B, 4 and 5. Each test run was 120 minutes in duration. Sampling was performed along a grid of points determined using EPA Method 1. Exhaust gas flow measurements were taken using an S-type pitot tube, K-type thermocouple and inclined-vertical manometer in accordance with EPA Method 2. A sample of exhaust gas was withdrawn from the stack at an isokinetic flow rate through a heated stainless steel nozzle and probe, through a heated quartz-fiber filter, through four chilled glass impingers containing known masses of water or silica gel, and through a dry gas meter. (See Figure 5-1 at right.) The default dry molecular weight for combustion sources (30 lbs/lb-mole) listed in EPA Method 3 was combined with pressure and temperature measurements to calculate stack gas velocity in accordance with EPA Method 2. Stack gas moisture concentrations were determined gravimetrically in accordance with EPA Method 4. Following each sampling period, the filter and rinses of the nozzle and probe were recovered and returned to EMCo's laboratory for gravimetric analysis. Following analysis, the particulate mass captured during each test run was combined with concurrent flow and moisture data to calculate particulate matter emissions in units of pounds per hour (lb/hr). The particulate mass captured during each test run was combined with concurrent CO₂ concentration data from the plant CEMS¹ and the appropriate fuel F-factor from EPA Method 19 (1,800 scf/mmBtu) to calculate PM emissions in units of pounds per million British thermal units (lb/mmBtu) for comparison to the applicable emission limit.



40 CFR Part 60, Appendix A: Method 5, Figure 5-1

¹ EPA Method 3B §6.0 states "As an alternative to the sampling apparatus and systems described herein, other sampling systems may be used, provided such systems are ... capable of yielding acceptable results." As NESHAP UUUUUU requires certified Part 75 CEMS CO₂ data to calculate SO₂ and mercury emissions in units of lb/mmBtu, CEMS CO₂ data are considered acceptable for PM emission calculations as well.

Appended Information

Supporting data for this testing program are included as follows.

Appendix A: Test Summary

- Data Reduction Spreadsheet
- Sample Calculations

Appendix B: Field Data

- Field Datasheets

Appendix C: Laboratory Data

- Gravimetric Analysis

Appendix D: CEMS Data

- Test Run CEMS Printouts

Appendix E: Calibration Information

- Dry Gas Meter Pre-Test and Post-Test Calibrations
- Critical Orifice Calibration Certificate
- AETB Certification



Project PC16-0001.9

Appendix A: Test Summary

Data Reduction Spreadsheets

Sample Calculations

Θ	Run #	1	2	3
	Start Time	5:22	8:03	10:22
	Stop Time	7:31	10:11	12:30
	Sample Time (min.)	120	120	120

EPA Method 2 Data		1	2	3	Average
Inputs					
D _s	Stack Diameter (inches)	323.3	323.3	323.3	323.3
P _{bar}	Barometric Pressure ("Hg)	23.77	23.77	23.77	23.77
P _g	Stack Static Pressure ("H ₂ O)	-2.4	-2.4	-2.4	-2.4
C _p	Pitot Tube Coefficient (unitless)	0.84	0.84	0.84	0.84
VΔp _{avg}	Avg. Velocity Head of Stack Gas V("H ₂ O)	0.8469	0.8478	0.8503	0.8483
T _s	Stack Gas Temperature (°F)	116	117	118	117
Calculations					
A	Stack Area (ft ²)	570.084	570.084	570.084	570.084
P _g	Stack Static Pressure ("Hg)	-0.18	-0.18	-0.18	-0.18
M _d	Stack Gas Molecular Weight, dry basis (lb/lb-mole)	30.00	30.00	30.00	30.00
M _s	Stack Gas Molecular Weight, wet basis (lb/lb-mole)	28.52	28.55	28.52	28.53
P _s	Absolute Stack Pressure ("Hg)	23.59	23.59	23.59	23.59
T _{s(abs)}	Absolute Stack Gas Temperature (°R)	576	577	578	577
V _s	Stack Gas Velocity (ft/sec)	56.3	56.3	56.6	56.4
Q	Stack Gas Dry Volumetric Flow Rate (dscf/hr)	73,182,553	73,376,847	73,337,702	73,299,034
Q	Stack Gas Dry Volumetric Flow Rate (dscf/min)	1,219,709	1,222,947	1,222,295	1,221,651

CEMS Diluent Data		1	2	3	Average
CO ₂ (%vw)		11.0	11.0	10.9	11.0
CO ₂ (%vd)		12.5	12.5	12.4	12.5

EPA Method 4 Data		1	2	3	Average
Inputs					
V _{lc}	Volume of Water Condensed (mL)	240.6	236.3	240.4	239.1
V _m	Volume of Stack Gas Collected (dcf)	104.234	105.699	105.317	105.083
Y	Meter Calibration Factor (unitless)	1.0016	1.0016	1.0016	1.0016
ΔH	Pressure Differential Across Orifice ("H ₂ O)	2	2	2	2.0
T _m	Temperature at Gas Meter (°F)	87	91	94	91
Calculations					
P _m	Absolute Pressure at Gas Meter ("Hg)	23.92	23.92	23.92	23.92
T _m	Absolute Temperature at Gas Meter (°R)	547	551	554	550.7
V _{wc(std)}	Volume of Water Condensed (scf)	11.32	11.12	11.31	11.25
V _{m(std)}	Sample Gas Volume (dscf)	80.52	81.06	80.33	80.64
B _{ws act}	Observed Stack Gas Moisture Content (%/100)	0.123	0.121	0.123	0.122
B _{ws sat}	Saturated Moisture Content (%/100)	0.131	0.134	0.138	0.134
B _{ws}	Moisture Content Used (%/100)	0.123	0.121	0.123	0.122

EPA Method 5 Data		1	2	3	Average
Inputs					
D _n	Nozzle diameter (")	0.24	0.24	0.24	0.24
C1	Mass of PM collected on filter (mg)	5.5	5.8	5.5	5.6
C2	Mass of PM collected in rinses (mg)	20.4	8.5	1.4	10.1
Emission Calculations					
F _c	Fuel F-Factor (scf/mmBtu)	1800	1800	1800	1800
A _n	Cross-sectional area of nozzle (ft ²)	3.14E-04	3.14E-04	3.14E-04	3.14E-04
I	Isokinetic variation (%)	99.9	100.3	99.4	99.9
m _n	Total Filterable PM mass less blank (mg)	25.9	14.3	6.9	15.7
C _s	Filterable Particulate concentration (gr/dscf)	0.005	0.003	0.001	0.003
C _s	Filterable Particulate concentration (lb/dscf)	7.09E-07	3.89E-07	1.89E-07	4.29E-07
E _{lb/hr}	Filterable Particulate mass emission rate (lb/hr)	52	29	14	31
	Boiler Load (MW)	476	477	477	477
	Filterable Particulate mass emission rate (lb/MW-hr)	0.11	0.06	0.03	0.07
F _c	Filterable Particulate mass emission rate (lb/mmBtu)	0.010	0.006	0.003	0.006
8760 hrs/yr	Filterable Particulate mass emission rate (tons/year)	227	125	61	138

EPA Method 5: Determination of Particulate Matter Emissions (40 CFR Part 60, Appendix A-1)

Variables

Variable	Value	Definition	Unit of Measurement
D _s	323.3	Stack Diameter	inches
A	570.08	Cross-Sectional Area of the Stack	ft ²
P _g	-2.40	Stack Static Pressure	in. H ₂ O
P _g	-0.18	Stack Static Pressure	in. Hg
%CO ₂	12.5	Concentration of Carbon Dioxide	Dry Volume Percent (%vd)
M _d	30.00	Dry Molecular Weight of the Stack Gas (default)	lb/lb-mole
P _{bar}	23.77	Barometric Pressure	in. Hg
ΔH	2.00	Pressure Differential across Orifice	in. H ₂ O
P _m	23.92	Absolute Pressure at Gas Meter	in.Hg
t _m	87	Temperature at Gas Meter	°F
T _m	547	Absolute Temperature at Gas Meter	°R
K1	0.04706	Conversion Factor	ft ³ /mL
V _{lc}	240.6	Volume of Water Condensed	g
V _{wc(std)}	11.32	Volume of Water Condensed	scf
K ₄	17.64	Constant	°R/in.Hg
Y	1.0016	Meter Calibration Factor	Unitless
V _m	104.234	Volume of Stack Gas Collected	dcf
V _{m(std)}	80.524	Sample Gas Volume	dsfc
B _{ws}	0.123	Stack Gas Moisture Content	%/100
M _s	28.52	Actual Molecular Weight of the Stack Gas	lb/lb-mole
P _s	23.59	Absolute Stack Pressure	in. Hg
T _s	116	Average Stack Temperature	°F
T _{s(abs)}	576	Average Absolute Stack Temperature	°R
K _p	85.49	Conversion Factor	(ft/sec) x V(((lb/lb-mole)(in.Hg))/((°R)(in.H ₂ O)))
C _p	0.84	Pitot Coefficient	Dimensionless
AvgVΔp	0.8469	Average Square Root of Velocity Head Readings	in. H ₂ O
V _s	56.27	Average Stack Gas Velocity	ft/sec
T _{std}	528	Standard Absolute Temperature	°R
P _{std}	29.92	Standard Absolute Pressure	in. Hg
Q	73,182,553	Dry Volumetric Flow Rate Corrected to Standard Conditions	dsfc/hr
D _n	0.24	Nozzle Diameter	inches
A _n	3.14E-04	Cross-Sectional Area of the Nozzle	ft ²
m _n	25.90	Total PM and CPM Mass	mg
C _s	7.09E-07	Particulate Concentration	lb/dsfc
E _{lb/hr}	51.9	PM Mass Emission Rate	pounds per hour
F _c	1800	F-Factor from EPA Method 19	scf/mmBtu
E _{lb/mmBtu}	0.010	PM Mass Emission Rate	pounds per million Btu
E _{tons/yr}	227.3	PM Mass Emission Rate	tons per year
K5	0.0945	Constant	(in.Hg · min) / (°R · sec)
Θ	120	Sample Time	minutes
I	99.9 %	Isokinetic variation	percent

PC16-1.9
PaciFiCorp
Huntington Unit 1
Run #1 Sample Calculations

EPA Method 5: Determination of Particulate Matter Emissions (40 CFR Part 60, Appendix A-1)

$$A = \pi(D_s/24)^2$$

$$\pi(323.3/24)^2$$

$$= 570.08 \text{ ft}^2$$

$$P_g = P_{bar}/13.6$$

$$= -2.4/13.6$$

$$= -0.18 \text{ in. Hg}$$

$$M_d = 30.00 \text{ lb/lb-mole}$$

$$P_m = P_{bar} + (\Delta H/13.6)$$

$$= 23.77 + (2/13.6)$$

$$= 23.92 \text{ in. Hg}$$

$$T_m = 460 + t_m$$

$$= 460 + 87$$

$$= 547 \text{ R}$$

$$V_{wc(std)} = K_1 \times V_{lc}$$

$$= 0.04706 \times 240.6$$

$$= 11.32 \text{ scf} \quad (Eq. 4-1)$$

$$V_{m(std)} = \frac{K_4 \times Y \times V_m \times P_m}{T_m}$$

$$= \frac{17.64 \times 1.0016 \times 104.234 \times 23.92}{547}$$

$$= 80.52 \text{ dscf} \quad (Eq. 4-3)$$

$$B_{ws} = \frac{V_{wc(std)}}{V_{wc(std)} + V_{m(std)}}$$

$$= \frac{11.32}{11.32 + 80.52}$$

$$= 0.123 (\%/100) \quad (Eq. 4-4)$$

$$M_s = M_d \times (1 - B_{ws}) + (18.0 \times B_{ws})$$

$$= 30.00 \times (1 - 0.123) + (18.0 \times 0.123)$$

$$= 28.52 \text{ lb/lb-mole} \quad (Eq. 2-6)$$

$$P_s = P_{bar} + P_g$$

$$= 23.77 + (-0.18)$$

$$= 23.59 \text{ in. Hg}$$

$$T_{s(abs)} = 460 + T_s$$

$$= 460 + 116$$

$$= 576 \text{ R}$$

PC16-1.9
PaciFiCorp
Huntington Unit 1
Run #1 Sample Calculations

EPA Method 5: Determination of Particulate Matter Emissions (40 CFR Part 60, Appendix A-1)

$$V_s = K_p \times C_p \times Avgv / \Delta p \times \sqrt{\frac{T_{s(abs)}}{(P_s \times M_s)}}$$

$$= 85.49 \times 0.84 \times 0.8469 \times \sqrt{\frac{576}{(23.59 \times 28.52)}}$$

$$= 56.3 \text{ ft/sec}$$

(Eq. 2-7)

$$Q = 3600 \times (1 - B_{ws}) \times (V_s) \times (A) \times \frac{(T_{std} \times P_s)}{(T_{s(abs)} \times P_{std})}$$

$$= 3600 \times (1 - 0.123) \times (56.27) \times (570.08) \times \frac{(528 \times 23.59)}{(576 \times 29.92)}$$

$$= 73,182,553 \text{ dscf/hr}$$

(Eq. 2-8)

$$A_n = \pi(D_n/24)^2$$

$$\pi(0.24/24)^2$$

$$= 3.14E-04 \text{ ft}^2$$

$$C_s = \frac{m_n}{(mg/g)(g/lb)(V_{m(std)})}$$

$$= \frac{25.9}{(1000)(453.592)(80.524)}$$

$$= 7.09E-07 \text{ lb/dscf}$$

$$E_{lb/hr} = C_s \times Q$$

$$= 7.09E-07 \times 73182553$$

$$= 51.9 \text{ lb/hr}$$

$$E_{lb/mmBtu} = \frac{C_s \times F_c \times 100}{(CO_2\%vd)}$$

$$= \frac{7.09E-07 \times 1800 \times 100}{(12.5)}$$

$$= 0.010 \text{ lb/mmBtu}$$

$$E_{tons/yr} = \frac{E_{lb/hr} \times (\text{Hrs/yr})}{(\text{lbs/ton})}$$

$$= \frac{51.89 \times 8,760}{2000}$$

$$= 227.3 \text{ tons/year}$$

$$I = \frac{K5 \times T_{s(abs)} \times V_{m(std)} \times 100}{P_{s(abs)} \times V_s \times A_n \times \Theta \times (1 - B_{ws})}$$

$$= \frac{0.0945 \times 576 \times 80.524 \times 100}{23.59 \times 56.27 \times 3.1E-04 \times 120 \times (1 - 0.123)}$$

$$= 99.9 \%$$

(Eq. 5-7)



Project PC16-0001.9
Appendix B: Field Data
Field Datasheets

Emissions Measurement Company: Method 5 Data Sheet

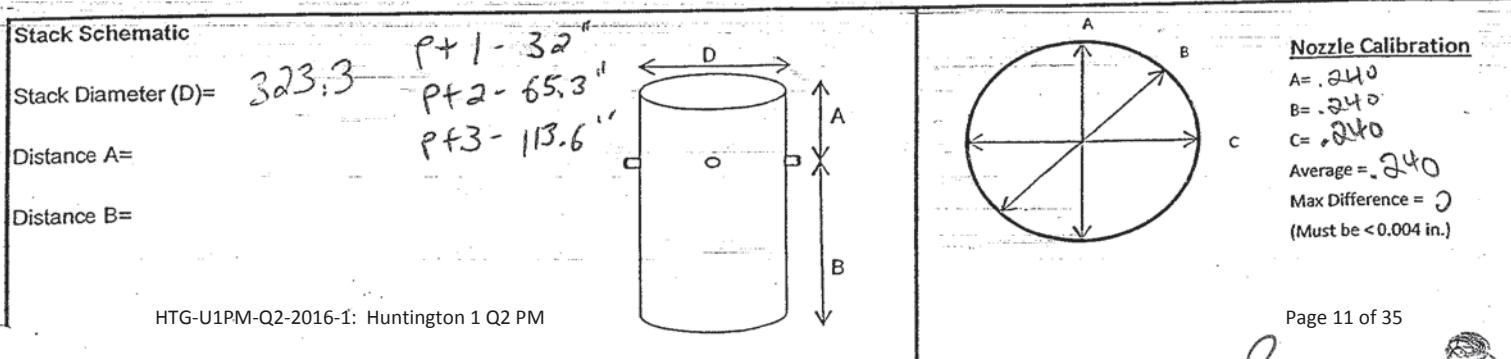
EMCo Job #:	PC 16-022	Operator(s):	WS, SIS
Client:	PacifiCorp	Barometric pressure ("Hg):	23.77
Source:	Hntgtn U1	Static pressure ("H ₂ O):	-2.4
Date:	6-28-16	Leak Check ("H ₂ O @ Vac):	0.00 @ 1.3"
Run #	1	Leak Check ("H ₂ O @ Vac):	0.00 @ 11"
Meterbox ID:	M5-4	Pitot ID / Coeff:	0.94
Meterbox Y =	1.0016	ΔH@=	1.7935
O ₂ %:	7.1	Pitot Leak Check:	✓
CO ₂ %:	11.6	Nozzle Diameter:	0.240
Start Time	522	K Factor:	2.76
		Stop Time	731

Impinger Weights (x.x g)	Initial	Final
Impinger 1		
Impinger 2		
Impinger 3		
Impinger 4 (SG)		
Total	798.0	1038.6
Total		240.6

Filter ID:
Tin ID:

219.971

Traverse Point	Sample Time	Stack Temp (°F)	Probe Temp (°F)	Filter Temp (°F)	Velocity Δp ("H ₂ O)	Orifice Pressure ΔH ("H ₂ O)	Vacuum ("Hg)	Sample Volume (ft ³)	DGM Temp (°F) Inlet	DGM Temp (°F) Outlet	Imp. Outlet Temp (°F)
								219.510			
1-1	10	117	319	320	0.61	1.7	5	227.9	83	81	52
-2	20	118	320	320	0.74	2.0	6	236.7	85	81	64
-3	30	117	318	320	0.78	2.2	7	245.5	87	82	63
2-1	40	116	319	320	0.60	1.7	5	253.3	88	82	64
-2	50	116	320	320	0.75	2.1	6	261.9	90	83	61
-3	60	116	319	320	0.82	2.3	7	271.6	91	84	64
3-1	70	116	320	319	0.61	1.7	5	279.4	90	84	60
-2	80	116	319	321	0.77	2.1	6	288.1	92	84	60
-3	90	116	320	320	0.81	2.3	7	298.1	93	85	63
4-1	100	116	319	320	0.58	1.6	4	306.7	92	85	63
-2	110	116	320	320	0.75	2.1	5	314.8	92	85	63
-3	120	116	320	320	0.82	2.3	5	324.205	92	85	62
12	120	116	318	319	0.8469	2.01	7	104.234	87		64
Total	Total	Average	Minimum	Minimum	Avg VΔp	Average	Max.	Total	Average		Maximum



Emissions Measurement Company: Method 5 Data Sheet

EMCo Job #:	PC 16-Q2	Operator(s):	WS, SIS
Client:	Pacificoff	Barometric pressure ("Hg):	23.77
Source:	Huntington 1	Static pressure ("H ₂ O):	-2.4
Date:	6-28-16	Leak Check ("H ₂ O @ Vac):	0.00 ^c / 11"
Run #	2	Leak Check ("H ₂ O @ Vac):	0.05 ^c / 0.2"
Meterbox ID:	M5-4	Pitot ID / Coeff:	✓ 0.84
Meterbox Y = 1.0016	ΔH@ = 1.7935	Pitot Leak Check:	✓ 0.240
O ₂ %:	7.1	Nozzle Diameter:	0.240
CO ₂ %:	11.6	K Factor:	2.76
Start Time	8:03	Stop Time	10:11

Impinger Weights (x.x g)	Initial	Final
Impinger 1		
Impinger 2		
Impinger 3		
Impinger 4 (SG)		
Total	825.3	1061.6
Total	226.3	

Filter ID:

Tin ID:

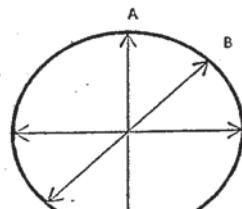
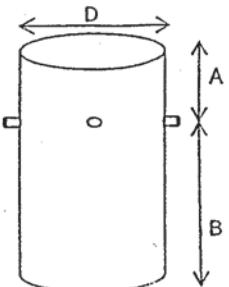
Traverse Point	Sample Time	Stack Temp (°F)	Probe Temp (°F)	Filter Temp (°F)	Velocity Δp ("H ₂ O)	Orifice Pressure ΔH ("H ₂ O)	Vacuum ("Hg)	Sample Volume (ft ³)	DGM Temp (°F) Inlet	DGM Temp (°F) Outlet	Imp. Outlet Temp (°F)
								323.061			
1-1	10	117	320	321	0.61	1.7	7	332.3	89	84	52
-2	20	117	319	321	0.75	2.1	6	342.0	91	84	55
-3	30	118	318	321	0.82	2.3	7	351.5	95	87	63
2-1	40	118	320	320	0.59	1.6	5	359.1	94	87	62
-2	50	117	319	319	0.74	2.0	6	368.5	95	87	62
-3	60	117	320	320	0.82	2.3	7	376.4	95	88	62
3-1	70	118	319	320	0.61	1.7	5	385.8	95	88	62
-2	80	117	320	319	0.74	2.0	6	394.7	95	88	62
-3	90	117	319	319	0.81	2.3	7	402.1	95	88	63
4-1	100	116	320	320	0.60	1.7	5	408.6	96	89	63
-2	110	116	320	320	0.75	2.0	6	419.1	96	89	64
-3	120	116	319	319	0.82	2.3	7	428.100	95	88	57
12	120	117	318	319	0.8478	2.00	7	105.699	91		64
Total	Total	Average	Minimum	Minimum	Avg VΔp	Average	Max.	Total	Average		Maximum

Stack Schematic

Stack Diameter (D)=

Distance A=

Distance B=



Nozzle Calibration

A=

B=

C=

Average =

Max Difference =

(Must be < 0.004 in.)

Emissions Measurement Company: Method 5 Data Sheet

EMCo Job #:	PC 16-Q2	Operator(s):	WS, SJS
Client:	pacificorp	Barometric pressure ("Hg):	23.77
Source:	Huntington	Static pressure ("H ₂ O):	-2.9
Date:	6-28-16	Leak Check ("H ₂ O @ Vac):	0.000 11"
Run #	3	Leak Check ("H ₂ O @ Vac):	0.000 13"
Meterbox ID:	M5-4	Pitot ID / Coeff:	0.84
Meterbox Y = 1,0016 ΔH@= 1.7935		Pitot Leak Check:	✓
O ₂ %:	7.1	Nozzle Diameter:	0.240
CO ₂ %:	11.6	K Factor:	2.76
Start Time	1022	Stop Time	1230

Impinger Weights (x.g)	Initial	Final
Impinger 1		
Impinger 2		
Impinger 3		
Impinger 4 (SG)		
Total	734.9	975.3
Total		240.4

Filter ID:

Tin ID:

Traverse Point	Sample Time	Stack Temp (°F)	Probe Temp (°F)	Filter Temp (°F)	Velocity Δp ("H ₂ O)	Orifice Pressure ΔH ("H ₂ O)	Vacuum ("Hg)	Sample Volume (ft ³)	DGM Temp (°F) Inlet	DGM Temp (°F) Outlet	Imp. Outlet Temp (°F)
								428.839			
1-1	10	118	319	322	0.61	1.7	4	437.0	93	88	61
-2	20	118	320	320	0.76	2.1	5	445.6	96	89	60
-3	30	118	319	321	0.81	2.3	6	454.3	96	89	65
2-1	40	118	319	320	0.60	1.7	4	461.7	96	90	63
-2	50	118	318	319	0.75	2.1	5	470.3	97	90	62
-3	60	118	320	318	0.82	2.3	7	480.7	97	90	63
3-1	70	118	319	320	0.61	1.7	4	489.6	98	91	61
-2	80	118	320	321	0.76	2.1	5	498.9	99	92	62
-3	90	118	319	320	0.81	2.3	6	507.7	99	92	62
4-1	100	118	320	321	0.60	1.7	4	516.3	98	91	62
-2	110	118	319	320	0.75	2.1	5	526.8	98	91	62
-3	120	118	320	319	0.83	2.3	6	534.156	98	91	62
12	120	(118)	318	318	0.8503	2.033	7	105.317	94		65
Total	Total	Average	Minimum	Minimum	Avg. Δp	Average	Max.	Total	Average		Maximum

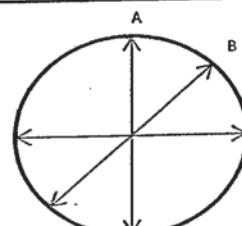
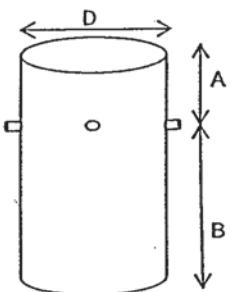
Stack Schematic

Stack Diameter (D)=

Distance A=

Distance B=

3944



Nozzle Calibration

A=

B=

C=

Average =

Max Difference =

(Must be < 0.004 in.)



Project PC16-0001.9
Appendix C: Lab Data
Gravimetric Analysis

Project Code:	PC16-1.9
Date Finalized:	7/11/2016
Analyst:	Parks

Laboratory Results Summary	
Sample ID	Filterable Particulate Matter (mg)
Huntington 1, Run #1	25.9
Huntington 1, Run #2	14.3
Huntington 1, Run #3	6.9

No blank corrections were performed.

Analytical Narrative

Quartz fiber filters were dessicated and tared to a constant weight in the EMCo laboratory prior to sampling. Following testing, the filters were dessicated for at least 24 hours, then weighed to a constant weight (± 0.5 mg). The acetone rinses were measured to the nearest milliliter, transferred to tared aluminum weighing dishes, taken to dryness under a fume hood, then weighed to a constant weight (± 0.5 mg). Each result above represents total filterable particulate matter for each test run (acetone rinse + filter catch), with no blank correction performed unless otherwise indicated.

Instrumentation

All measurements were taken using a Torbal Model AGCN200 Analytical Balance under laboratory conditions. The instrument is auto-calibrated and challenged with three NIST-traceable reference weights daily.

Detection Limit / Sensitivity

All measurements are recorded to 0.0001g (0.1mg).

Notes

No deviations from the analytical procedure from EPA Method 5 were noted. All samples were received in good condition. After analysis, all samples are archived for a period of one year.

Attachments

Gravimetric Analysis Logs

Sample Chain of Custody



EPA Method 5 Gravimetric Analysis Log

Project Code: PC16-1.9
Unit ID: Huntington 1

Front-Half Particulate Matter Filter Catch

Filter #	Run #1		Run #2		Run #3	
	Date	Weight (g)	Date	Weight (g)	Date	Weight (g)
Final Weight	7/8/16	0.3939	7/8/16	0.3963	7/8/16	0.3949
Tare Weight (g)	1/4/16	0.3884	1/4/16	0.3905	1/4/16	0.3894
Filter Catch (g)		0.0055		0.0058		0.0055

Front-Half Particulate Matter Acetone Rinse Catch

Dish #	Run #1		Run #2		Run #3	
	Date	Weight (g)	Date	Weight (g)	Date	Weight (g)
Final Weight	7/8/16	6.6027	7/8/16	6.4321	7/8/16	6.4614
Tare Weight (g)	2/22/16	6.5823	2/22/16	6.4236	2/18/16	6.4600
Total Rinse Catch (g)		0.0204		0.0085		0.0014

Total Particulate Catch

	Run #1	Run #2	Run #3
Filter Catch (g)	0.0055	0.0058	0.0055
+ Rinse Catch (g)	0.0204	0.0085	0.0014
Total PM (g)	0.0259	0.0143	0.0069

Laboratory Chain of Custody Record



Project PC16-0001.9
Appendix D: CEMS Data
CEMS Printouts for Test Runs

Average Data

Plant: HUNTINGTON PLANT

Interval: 1 Minute

Type: Block

Report Period: 06/28/2016 05:22 Through 06/28/2016 07:31

Time Online Criteria: 1 minute(s)

Source	Parameter Unit	UNIT1				
		BARPRESS (INHG)	CO2 (PCT)	OPACITY (PCT)	STKTEMP (DEGF)	UNITLOAD (MW)
06/28/16	05:22	23.910	10.9	0.5	112.39	468
06/28/16	05:23	23.911	11.0	0.5	112.21	468
06/28/16	05:24	23.911	11.0	0.5	112.12	468
06/28/16	05:25	23.912	11.0	0.5	112.08	469
06/28/16	05:26	23.911	11.0	0.5	112.11	470
06/28/16	05:27	23.912	10.9	0.5	112.20	472
06/28/16	05:28	23.912	10.9	0.5	112.40	473
06/28/16	05:29	23.912	10.8	0.5	112.17	473
06/28/16	05:30	23.912	10.9	0.5	112.00	473
06/28/16	05:31	23.913	11.0 IC	0.5	112.01	473
06/28/16	05:32	23.913	8.1 IC	0.5	112.30	475
06/28/16	05:33	23.912	0.6 IC	0.5	112.62	478
06/28/16	05:34	23.913	0.0 IC	0.5	112.91	479
06/28/16	05:35	23.913	0.0 IC	0.5	113.00	479
06/28/16	05:36	23.913	0.0 IC	0.5	112.89	479
06/28/16	05:37	23.914	0.0 IC	0.5	112.89	478
06/28/16	05:38	23.915	0.0 IC	0.5	113.14	476
06/28/16	05:39	23.916	0.1 IC	0.5	113.17	474
06/28/16	05:40	23.916	0.0 IC	0.5	112.64	474
06/28/16	05:41	23.916	0.0 IC	0.5	112.36	475
06/28/16	05:42	23.916	0.0 IC	0.5	112.37	478
06/28/16	05:43	23.917	0.0 IC	0.5	112.21	478
06/28/16	05:44	23.917	0.0 IC	0.5	112.34	476
06/28/16	05:45	23.917	0.0 IC	0.5	112.53	473
06/28/16	05:46	23.919	3.2 IC	0.5	112.47	472
06/28/16	05:47	23.919	10.9 IC	0.5	112.47	470
06/28/16	05:48	23.920	11.2 IC	0.5	112.47	470
06/28/16	05:49	23.920	11.2 IC	0.5	112.47	470
06/28/16	05:50	23.921	11.2 IC	0.5	112.47	473
06/28/16	05:51	23.921	11.3 IC	0.5	112.47	474
06/28/16	05:52	23.921	11.3 IC	0.5	112.47	475
06/28/16	05:53	23.922	8.1 IC	0.5	112.46	478
06/28/16	05:54	23.922	7.8 IC	0.5	112.03	479
06/28/16	05:55	23.922	10.8 IC	0.5	112.25	480
06/28/16	05:56	23.922	11.0 C	0.5	112.02	480
06/28/16	05:57	23.922	11.0	0.5	112.15	479
06/28/16	05:58	23.922	11.0	0.5	112.19	478
06/28/16	05:59	23.922	11.0	0.5	112.07	478
06/28/16	06:00	23.922	11.0	0.5	112.03	479
06/28/16	06:01	23.923	11.1	0.5	112.00	480

F = Unit Offline

E = Exceedance

M = Maintenance

T = Out Of Control

C = Calibration

S = Substituted

* = Suspect

Average Data

Plant: HUNTINGTON PLANT

Interval: 1 Minute

Type: Block

Report Period: 06/28/2016 05:22 Through 06/28/2016 07:31

Time Online Criteria: 1 minute(s)

06/28/16	06:02	23.923	11.1	0.5	112.00	481
06/28/16	06:03	23.923	11.1	0.5	111.93	483
06/28/16	06:04	23.923	11.1	0.5	112.10	485
06/28/16	06:05	23.924	11.1	0.5	112.50	484
06/28/16	06:06	23.923	11.0	0.5	112.34	481
06/28/16	06:07	23.923	11.0	0.5	111.81	477
06/28/16	06:08	23.923	10.9	0.5	111.78	474
06/28/16	06:09	23.924	10.9	0.5	111.97	472
06/28/16	06:10	23.924	10.9	0.5	112.13	472
06/28/16	06:11	23.924	11.0	0.5	112.14	472
06/28/16	06:12	23.924	11.0	0.5	112.17	475
06/28/16	06:13	23.924	11.0	0.5	112.01	476
06/28/16	06:14	23.924	11.1	0.5	111.75	477
06/28/16	06:15	23.924	11.1	0.5	111.72	479
06/28/16	06:16	23.924	11.1	0.5	111.94	480
06/28/16	06:17	23.924	11.0	0.5	111.75	480
06/28/16	06:18	23.924	11.1	0.5	111.35	481
06/28/16	06:19	23.924	11.1	0.5	111.76	480
06/28/16	06:20	23.925	11.0	0.5	112.37	480
06/28/16	06:21	23.924	10.9	0.5	112.50	478
06/28/16	06:22	23.925	10.9	0.5	112.29	477
06/28/16	06:23	23.925	11.0	0.5	112.18	475
06/28/16	06:24	23.925	10.9	0.5	112.03	476
06/28/16	06:25	23.925	11.0	0.5	112.05	476
06/28/16	06:26	23.925	11.0	0.5	111.96	477
06/28/16	06:27	23.925	11.0	0.5	111.93	477
06/28/16	06:28	23.925	11.0	0.5	111.91	477
06/28/16	06:29	23.926	10.9	0.5	111.92	476
06/28/16	06:30	23.926	10.9	0.5	112.04	476
06/28/16	06:31	23.926	10.9	0.5	112.17	477
06/28/16	06:32	23.926	11.0	0.5	112.12	477
06/28/16	06:33	23.926	11.0	0.5	112.20	477
06/28/16	06:34	23.927	11.0	0.5	112.33	477
06/28/16	06:35	23.926	11.0	0.5	112.16	477
06/28/16	06:36	23.927	11.0	0.5	112.03	477
06/28/16	06:37	23.927	10.9	0.5	112.22	476
06/28/16	06:38	23.927	10.9	0.5	112.41	474
06/28/16	06:39	23.928	10.9	0.5	112.63	471
06/28/16	06:40	23.927	10.9	0.5	112.58	472
06/28/16	06:41	23.929	10.9	0.5	112.27	475
06/28/16	06:42	23.929	11.0	0.5	112.00	479
06/28/16	06:43	23.929	11.1	0.5	111.71	480
06/28/16	06:44	23.929	11.0	0.5	111.67	481

F = Unit Offline

E = Exceedance

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C = Calibration

S = Substituted

* = Suspect

Average Data

Plant: HUNTINGTON PLANT

Interval: 1 Minute

Type: Block

Report Period: 06/28/2016 05:22 Through 06/28/2016 07:31

Time Online Criteria: 1 minute(s)

06/28/16	06:45	23.928	11.0	0.5	111.93	480
06/28/16	06:46	23.930	10.9	0.5	112.41	479
06/28/16	06:47	23.930	11.0	0.5	112.46	477
06/28/16	06:48	23.929	11.0	0.5	112.39	475
06/28/16	06:49	23.929	10.9	0.5	112.49	473
06/28/16	06:50	23.929	10.8	0.5	112.53	472
06/28/16	06:51	23.929	10.9	0.5	112.41	472
06/28/16	06:52	23.929	10.9	0.5	112.24	473
06/28/16	06:53	23.929	11.0	0.5	112.10	476
06/28/16	06:54	23.929	11.1	0.5	112.10	477
06/28/16	06:55	23.929	11.1	0.5	111.92	478
06/28/16	06:56	23.930	11.0	0.5	111.99	479
06/28/16	06:57	23.930	11.0	0.5	112.21	478
06/28/16	06:58	23.930	11.0	0.5	112.49	476
06/28/16	06:59	23.930	10.9	0.5	112.89	475
06/28/16	07:00	23.930	10.9	0.5	112.80	475
06/28/16	07:01	23.930	11.0	0.5	112.43	476
06/28/16	07:02	23.930	11.0	0.5	112.10	478
06/28/16	07:03	23.930	11.1	0.5	112.20	479
06/28/16	07:04	23.930	11.0	0.5	112.43	480
06/28/16	07:05	23.930	11.1	0.5	112.20	481
06/28/16	07:06	23.930	11.1	0.5	112.28	482
06/28/16	07:07	23.930	11.0	0.5	112.35	480
06/28/16	07:08	23.930	10.9	0.5	112.22	478
06/28/16	07:09	23.929	10.9	0.5	112.35	476
06/28/16	07:10	23.929	10.9	0.5	112.63	474
06/28/16	07:11	23.929	10.9	0.5	112.63	474
06/28/16	07:12	23.929	11.0	0.5	112.43	476
06/28/16	07:13	23.930	11.1	0.5	112.18	477
06/28/16	07:14	23.929	11.1	0.5	112.11	479
06/28/16	07:15	23.930	11.0	0.5	112.27	482
06/28/16	07:16	23.931	11.0	0.5	112.53	481
06/28/16	07:17	23.930	10.9	0.5	112.67	480
06/28/16	07:18	23.930	10.9	0.5	112.77	478
06/28/16	07:19	23.930	11.0	0.5	112.87	474
06/28/16	07:20	23.931	10.9	0.5	113.05	471
06/28/16	07:21	23.931	10.7	0.5	113.07	468
06/28/16	07:22	23.931	10.9	0.5	112.98	467
06/28/16	07:23	23.931	10.8	0.5	113.16	470
06/28/16	07:24	23.931	10.9	0.5	113.14	473
06/28/16	07:25	23.932	11.0	0.5	112.78	475
06/28/16	07:26	23.932	11.0	0.5	112.54	477
06/28/16	07:27	23.933	11.0	0.5	112.64	478

F = Unit Offline

E = Exceedance

M = Maintenance

T = Out Of Control

C = Calibration

S = Substituted

* = Suspect

Average Data

Plant: HUNTINGTON PLANT

Interval: 1 Minute

Type: Block

Report Period: 06/28/2016 05:22 Through 06/28/2016 07:31

Time Online Criteria: 1 minute(s)

06/28/16	07:28	23.933	11.0	0.5	112.77	479
06/28/16	07:29	23.933	11.0	0.5	112.78	479
06/28/16	07:30	23.934	11.0	0.5	112.87	478
06/28/16	07:31	23.934	11.0	0.5	112.76	478
<hr/>						
Average		23.924	11.0	0.5	112.32	476
Minimum		23.910	10.7	0.5	111.35	467
Maximum		23.934	11.1	0.5	113.17	485
Summation		3,110.171	1,152.6	65.0	14,601.93	61,911
Included Data Points		130	105	130	130	130
Total number of Data Points		130	130	130	130	130

F = Unit Offline

E = Exceedance

M = Maintenance

T = Out Of Control

Report Generated 07/01/2016 07:10 Huntington 1 Q2 PM

C = Calibration

S = Substituted

* = Suspect

Average Data

Plant: HUNTINGTON PLANT

Interval: 1 Minute

Type: Block

Report Period: 06/28/2016 08:03 Through 06/28/2016 10:11

Time Online Criteria: 1 minute(s)

Source	UNIT1					
	Parameter Unit	BARPRESS (INHG)	CO2 (PCT)	OPACITY (PCT)	STKTEMP (DEGF)	UNITLOAD (MW)
06/28/16	08:03	23.937	11.1 I	0.5	113.12	478
06/28/16	08:04	23.937	11.0 I	0.5	113.50	479
06/28/16	08:05	23.938	11.1	0.5	113.38	479
06/28/16	08:06	23.937	11.1	0.5	113.45	481
06/28/16	08:07	23.938	11.1	0.5	113.40	480
06/28/16	08:08	23.937	11.0	0.5	113.41	478
06/28/16	08:09	23.937	11.0	0.5	113.54	477
06/28/16	08:10	23.937	10.9	0.5	113.61	475
06/28/16	08:11	23.937	10.9	0.5	113.80	475
06/28/16	08:12	23.937	11.0	0.5	114.01	475
06/28/16	08:13	23.937	10.9	0.5	114.00	475
06/28/16	08:14	23.937	11.0	0.5	113.71	475
06/28/16	08:15	23.938	11.1	0.5	113.57	476
06/28/16	08:16	23.939	11.1	0.5	113.52	478
06/28/16	08:17	23.939	11.1	0.5	113.82	480
06/28/16	08:18	23.940	11.0	0.5	114.11	482
06/28/16	08:19	23.940	11.0	0.5	113.98	480
06/28/16	08:20	23.940	11.0	0.5	114.28	479
06/28/16	08:21	23.940	11.1	0.5	114.36	478
06/28/16	08:22	23.940	11.1	0.5	114.32	478
06/28/16	08:23	23.940	11.1	0.5	114.23	477
06/28/16	08:24	23.939	11.0	0.5	114.47	480
06/28/16	08:25	23.939	11.1	0.5	114.61	480
06/28/16	08:26	23.939	11.0	0.5	114.49	479
06/28/16	08:27	23.938	10.9	0.5	114.74	476
06/28/16	08:28	23.938	10.9	0.5	114.98	474
06/28/16	08:29	23.938	10.9	0.5	114.86	474
06/28/16	08:30	23.938	11.0	0.5	114.94	475
06/28/16	08:31	23.938	11.0	0.5	115.07	477
06/28/16	08:32	23.938	11.0	0.5	114.97	479
06/28/16	08:33	23.938	11.1	0.5	114.59	481
06/28/16	08:34	23.938	11.1	0.5	114.44	481
06/28/16	08:35	23.938	11.1	0.5	114.72	480
06/28/16	08:36	23.938	11.0	0.5	115.14	478
06/28/16	08:37	23.938	10.9	0.5	115.20	476
06/28/16	08:38	23.938	11.0	0.5	114.99	475
06/28/16	08:39	23.938	10.9	0.5	115.16	474
06/28/16	08:40	23.938	10.8	0.5	115.45	473
06/28/16	08:41	23.937	10.9	0.5	115.40	474

F = Unit Offline

E = Exceedance

M = Maintenance

T = Out Of Control

C = Calibration

S = Substituted

* = Suspect

Average Data

Plant: HUNTINGTON PLANT

Interval: 1 Minute

Type: Block

Report Period: 06/28/2016 08:03 Through 06/28/2016 10:11

Time Online Criteria: 1 minute(s)

06/28/16	08:42	23.937	10.9	0.5	115.36	474
06/28/16	08:43	23.937	11.0	0.5	114.95	476
06/28/16	08:44	23.936	11.0	0.5	114.78	477
06/28/16	08:45	23.937	11.0	0.5	115.00	478
06/28/16	08:46	23.937	11.1	0.5	114.97	480
06/28/16	08:47	23.937	11.1	0.5	115.09	483
06/28/16	08:48	23.937	11.1	0.5	114.99	482
06/28/16	08:49	23.937	11.0	0.5	114.75	481
06/28/16	08:50	23.937	11.0	0.5	114.60	479
06/28/16	08:51	23.936	11.0	0.5	114.86	476
06/28/16	08:52	23.936	10.8	0.5	115.18	474
06/28/16	08:53	23.936	10.9	0.5	115.14	472
06/28/16	08:54	23.936	11.0	0.5	115.00	475
06/28/16	08:55	23.935	11.0	0.5	114.75	478
06/28/16	08:56	23.935	11.1	0.5	114.67	480
06/28/16	08:57	23.935	11.1	0.5	114.94	481
06/28/16	08:58	23.934	11.0	0.5	115.21	480
06/28/16	08:59	23.934	10.9	0.5	115.17	475
06/28/16	09:00	23.934	10.9	0.5	115.14	471
06/28/16	09:01	23.935	11.0	0.5	114.89	472
06/28/16	09:02	23.934	11.0	0.5	114.87	476
06/28/16	09:03	23.934	11.0	0.5	115.07	478
06/28/16	09:04	23.934	11.0	0.5	114.96	480
06/28/16	09:05	23.933	11.1	0.5	114.88	481
06/28/16	09:06	23.933	11.0	0.5	114.85	480
06/28/16	09:07	23.933	11.0	0.5	114.92	479
06/28/16	09:08	23.932	11.0	0.5	115.14	477
06/28/16	09:09	23.932	11.0	0.5	115.21	476
06/28/16	09:10	23.932	11.0	0.5	115.11	473
06/28/16	09:11	23.932	10.9	0.5	115.22	472
06/28/16	09:12	23.932	10.9	0.5	115.26	471
06/28/16	09:13	23.932	10.9	0.5	115.31	473
06/28/16	09:14	23.932	11.0	0.5	115.40	476
06/28/16	09:15	23.931	11.0	0.5	115.15	477
06/28/16	09:16	23.931	11.0	0.5	115.40	477
06/28/16	09:17	23.931	10.9	0.5	115.59	478
06/28/16	09:18	23.931	10.9	0.5	115.46	477
06/28/16	09:19	23.931	10.9	0.5	115.38	475
06/28/16	09:20	23.930	10.9	0.5	115.40	474
06/28/16	09:21	23.930	10.9	0.5	115.30	475
06/28/16	09:22	23.930	11.0	0.5	115.22	477
06/28/16	09:23	23.930	11.0	0.5	115.12	479

F = Unit Offline

E = Exceedance

M = Maintenance

T = Out Of Control

C = Calibration

S = Substituted

* = Suspect

Average Data

Plant: HUNTINGTON PLANT

Interval: 1 Minute

Type: Block

Report Period: 06/28/2016 08:03 Through 06/28/2016 10:11

Time Online Criteria: 1 minute(s)

06/28/16	09:24	23.930	11.1	0.5	114.86	482
06/28/16	09:25	23.930	11.1	0.5	114.99	483
06/28/16	09:26	23.930	11.0	0.5	115.19	483
06/28/16	09:27	23.929	11.0	0.5	115.15	483
06/28/16	09:28	23.929	11.0	0.5	115.30	480
06/28/16	09:29	23.929	11.0	0.5	115.35	478
06/28/16	09:30	23.929	10.9	0.5	115.28	477
06/28/16	09:31	23.930	10.9	0.5	115.44	474
06/28/16	09:32	23.929	10.8	0.5	115.70	473
06/28/16	09:33	23.929	10.9	0.5	115.62	473
06/28/16	09:34	23.929	11.0	0.5	115.45	474
06/28/16	09:35	23.929	10.9	0.5	115.39	475
06/28/16	09:36	23.929	10.9	0.5	115.29	478
06/28/16	09:37	23.929	11.1	0.5	115.04	480
06/28/16	09:38	23.928	11.1	0.5	115.14	480
06/28/16	09:39	23.928	11.0	0.5	115.28	480
06/28/16	09:40	23.928	10.9	0.5	115.45	478
06/28/16	09:41	23.928	10.9	0.5	115.92	476
06/28/16	09:42	23.928	10.9	0.5	115.33	474
06/28/16	09:43	23.928	10.9	0.5	115.29	473
06/28/16	09:44	23.928	10.9	0.5	115.34	473
06/28/16	09:45	23.928	10.9	0.5	115.39	475
06/28/16	09:46	23.928	10.9	0.5	115.35	478
06/28/16	09:47	23.927	11.0	0.5	115.47	478
06/28/16	09:48	23.927	11.0	0.5	115.63	479
06/28/16	09:49	23.927	11.0	0.5	115.67	479
06/28/16	09:50	23.926	10.9	0.5	115.80	476
06/28/16	09:51	23.926	10.9	0.5	115.89	476
06/28/16	09:52	23.926	10.9	0.5	115.74	474
06/28/16	09:53	23.927	11.0	0.5	115.60	472
06/28/16	09:54	23.927	10.9	0.5	115.70	474
06/28/16	09:55	23.928	10.9	0.5	115.72	478
06/28/16	09:56	23.927	11.1	0.5	115.53	481
06/28/16	09:57	23.927	11.0	0.5	115.41	481
06/28/16	09:58	23.927	11.0	0.5	115.54	483
06/28/16	09:59	23.927	11.1	0.5	115.62	483
06/28/16	10:00	23.926	10.9	0.5	115.73	480
06/28/16	10:01	23.925	10.9	0.5	115.68	478
06/28/16	10:02	23.926	10.8	0.5	115.74	477
06/28/16	10:03	23.926	10.9	0.5	116.00	473
06/28/16	10:04	23.926	10.8	0.5	116.18	469
06/28/16	10:05	23.925	10.9	0.5	116.22	467

F = Unit Offline

E = Exceedance

M = Maintenance

T = Out Of Control

C = Calibration

S = Substituted

* = Suspect

Average Data

Plant: HUNTINGTON PLANT

Interval: 1 Minute

Type: Block

Report Period: 06/28/2016 08:03 Through 06/28/2016 10:11

Time Online Criteria: 1 minute(s)

06/28/16	10:06	23.925	10.9	0.5	115.94	473
06/28/16	10:07	23.925	11.1	0.5	115.82	476
06/28/16	10:08	23.926	11.0	0.5	115.91	475
06/28/16	10:09	23.926	10.9	0.5	116.02	473
06/28/16	10:10	23.926	11.0	0.5	116.04	474
06/28/16	10:11	23.927	11.0	0.5	115.97	475

Average	23.933	11.0	0.5	115.02	477
Minimum	23.925	10.8	0.5	113.12	467
Maximum	23.940	11.1	0.5	116.22	483
Summation	3,087.326	1,394.2	64.5	14,838.11	61,530
Included Data Points	129	127	129	129	129
Total number of Data Points	129	129	129	129	129

F = Unit Offline

E = Exceedance

M = Maintenance

T = Out Of Control

Report Generated 07/01/2016 07:11 Huntington 1 Q2 PM

C = Calibration

S = Substituted

* = Suspect

Average Data

Plant: HUNTINGTON PLANT

Interval: 1 Minute

Type: Block

Report Period: 06/28/2016 10:22 Through 06/28/2016 12:30

Time Online Criteria: 1 minute(s)

Source	Parameter Unit	UNIT1				
		BARPRESS (INHG)	CO2 (PCT)	OPACITY (PCT)	STKTEMP (DEGF)	UNITLOAD (MW)
06/28/16	10:22	23.926	10.7	0.5	116.57	479
06/28/16	10:23	23.926	10.9	0.5	116.33	481
06/28/16	10:24	23.926	10.9	0.5	116.14	479
06/28/16	10:25	23.925	10.8	0.5	116.14	474
06/28/16	10:26	23.925	10.9	0.5	116.20	470
06/28/16	10:27	23.925	10.9	0.5	116.11	467
06/28/16	10:28	23.925	11.0	0.5	116.07	468
06/28/16	10:29	23.926	11.0	0.5	115.99	472
06/28/16	10:30	23.926	11.0	0.5	116.10	475
06/28/16	10:31	23.926	11.1	0.5	116.29	478
06/28/16	10:32	23.926	11.1	0.5	115.94	479
06/28/16	10:33	23.925	11.2	0.5	115.76	480
06/28/16	10:34	23.924	11.1	0.5	115.82	480
06/28/16	10:35	23.924	11.0	0.5	116.03	478
06/28/16	10:36	23.923	11.0	0.5	116.11	476
06/28/16	10:37	23.923	11.0	0.5	116.08	474
06/28/16	10:38	23.923	11.0	0.5	116.08	473
06/28/16	10:39	23.923	11.0	0.5	115.91	474
06/28/16	10:40	23.923	11.1	0.5	115.98	475
06/28/16	10:41	23.924	11.1	0.5	116.12	477
06/28/16	10:42	23.924	11.1	0.5	115.98	480
06/28/16	10:43	23.924	11.1	0.5	115.92	480
06/28/16	10:44	23.924	11.1	0.5	115.82	481
06/28/16	10:45	23.924	11.1	0.5	115.77	483
06/28/16	10:46	23.923	11.1	0.5	115.92	480
06/28/16	10:47	23.923	11.0	0.5	116.25	476
06/28/16	10:48	23.923	11.0	0.5	116.37	474
06/28/16	10:49	23.923	11.0	0.5	116.41	474
06/28/16	10:50	23.924	11.1	0.5	115.76	476
06/28/16	10:51	23.924	11.2	0.5	116.31	479
06/28/16	10:52	23.925	11.1	0.5	116.40	479
06/28/16	10:53	23.925	11.0	0.5	116.33	479
06/28/16	10:54	23.925	11.1	0.5	116.33	477
06/28/16	10:55	23.925	11.0	0.5	116.42	474
06/28/16	10:56	23.924	11.0	0.5	116.27	475
06/28/16	10:57	23.924	11.1	0.5	116.06	475
06/28/16	10:58	23.924	11.1	0.6	116.11	477
06/28/16	10:59	23.923	11.2	0.6	116.43	479
06/28/16	11:00	23.923	11.1	0.6	116.64	480

F = Unit Offline

E = Exceedance

M = Maintenance

T = Out Of Control

C = Calibration

S = Substituted

* = Suspect

Average Data

Plant: HUNTINGTON PLANT

Interval: 1 Minute

Type: Block

Report Period: 06/28/2016 10:22 Through 06/28/2016 12:30

Time Online Criteria: 1 minute(s)

06/28/16	11:01	23.923	11.1	0.5	116.58	477
06/28/16	11:02	23.924	11.2	0.5	116.59	475
06/28/16	11:03	23.924	11.1	0.5	116.68	480
06/28/16	11:04	23.924	11.0	0.5	116.63	485
06/28/16	11:05	23.924	11.0	0.5	116.59	487
06/28/16	11:06	23.924	10.9	0.5	117.16	485
06/28/16	11:07	23.925	10.8	0.5	116.87	483
06/28/16	11:08	23.924	10.9	0.5	116.75	478
06/28/16	11:09	23.924	10.8	0.5	116.79	473
06/28/16	11:10	23.924	10.8	0.5	116.83	470
06/28/16	11:11	23.924	10.8	0.5	116.75	469
06/28/16	11:12	23.924	10.8	0.5	116.62	471
06/28/16	11:13	23.923	10.8	0.5	116.48	473
06/28/16	11:14	23.922	10.9	0.5	116.45	477
06/28/16	11:15	23.923	10.9	0.5	116.44	482
06/28/16	11:16	23.922	10.9	0.5	116.43	479
06/28/16	11:17	23.921	10.9	0.5	116.29	472
06/28/16	11:18	23.921	11.0	0.5	116.16	470
06/28/16	11:19	23.922	10.9	0.5	116.33	471
06/28/16	11:20	23.922	10.8	0.5	116.50	476
06/28/16	11:21	23.922	10.8	0.5	116.62	479
06/28/16	11:22	23.922	10.9	0.5	116.64	480
06/28/16	11:23	23.922	10.8	0.5	116.72	480
06/28/16	11:24	23.921	10.8	0.5	116.75	479
06/28/16	11:25	23.921	10.8	0.5	116.59	476
06/28/16	11:26	23.921	10.7	0.5	116.58	473
06/28/16	11:27	23.921	10.7	0.5	116.58	469
06/28/16	11:28	23.920	10.7	0.5	116.52	469
06/28/16	11:29	23.920	10.6	0.5	116.59	470
06/28/16	11:30	23.919	10.7	0.5	116.52	472
06/28/16	11:31	23.920	10.7	0.5	116.38	473
06/28/16	11:32	23.920	10.8	0.5	116.18	475
06/28/16	11:33	23.919	10.8	0.5	116.30	475
06/28/16	11:34	23.918	10.8	0.5	116.28	477
06/28/16	11:35	23.918	10.9	0.5	116.36	477
06/28/16	11:36	23.919	10.9	0.5	116.43	477
06/28/16	11:37	23.919	10.9	0.5	116.45	479
06/28/16	11:38	23.919	10.9	0.5	116.49	479
06/28/16	11:39	23.919	10.8	0.5	116.30	479
06/28/16	11:40	23.919	10.8	0.5	116.21	479
06/28/16	11:41	23.918	10.8	0.5	116.84	479
06/28/16	11:42	23.918	10.8	0.5	116.68	478

F = Unit Offline

E = Exceedance

M = Maintenance

T = Out Of Control

C = Calibration

S = Substituted

* = Suspect

Average Data

Plant: HUNTINGTON PLANT

Interval: 1 Minute

Type: Block

Report Period: 06/28/2016 10:22 Through 06/28/2016 12:30

Time Online Criteria: 1 minute(s)

06/28/16	11:43	23.917	10.8	0.5	116.77	475
06/28/16	11:44	23.917	10.8	0.5	116.70	474
06/28/16	11:45	23.917	10.8	0.5	116.70	473
06/28/16	11:46	23.916	10.8	0.5	116.67	474
06/28/16	11:47	23.916	10.7	0.5	116.56	475
06/28/16	11:48	23.916	10.7	0.5	116.45	477
06/28/16	11:49	23.916	10.8	0.5	116.49	476
06/28/16	11:50	23.917	10.8	0.5	116.27	475
06/28/16	11:51	23.916	10.8	0.5	116.31	475
06/28/16	11:52	23.916	10.8	0.5	116.48	476
06/28/16	11:53	23.916	10.9	0.5	115.86	478
06/28/16	11:54	23.915	10.9	0.5	116.02	480
06/28/16	11:55	23.915	10.9	0.5	116.11	481
06/28/16	11:56	23.915	10.8	0.5	116.11	482
06/28/16	11:57	23.915	10.8	0.5	116.39	481
06/28/16	11:58	23.914	10.8	0.5	116.55	479
06/28/16	11:59	23.913	10.8	0.5	116.34	478
06/28/16	12:00	23.913	10.8	0.5	116.42	477
06/28/16	12:01	23.913	10.8	0.5	116.85	475
06/28/16	12:02	23.913	10.7	0.5	116.88	475
06/28/16	12:03	23.913	10.8	0.5	116.82	474
06/28/16	12:04	23.913	10.8	0.5	116.81	475
06/28/16	12:05	23.912	10.8	0.5	116.77	476
06/28/16	12:06	23.912	10.8	0.5	116.75	476
06/28/16	12:07	23.911	10.7	0.5	116.73	476
06/28/16	12:08	23.910	10.7	0.5	116.75	476
06/28/16	12:09	23.910	10.8	0.5	116.77	477
06/28/16	12:10	23.910	10.9	0.5	116.72	477
06/28/16	12:11	23.909	10.7	0.5	116.65	476
06/28/16	12:12	23.908	10.7	0.5	116.50	475
06/28/16	12:13	23.908	10.8	0.5	116.49	477
06/28/16	12:14	23.908	10.9	0.5	116.43	478
06/28/16	12:15	23.908	10.9	0.5	116.29	479
06/28/16	12:16	23.908	10.9	0.5	116.36	480
06/28/16	12:17	23.908	10.8	0.5	116.74	479
06/28/16	12:18	23.908	10.7	0.5	116.70	478
06/28/16	12:19	23.907	10.8	0.5	116.52	477
06/28/16	12:20	23.906	10.8	0.5	116.53	476
06/28/16	12:21	23.906	10.8	0.5	116.63	476
06/28/16	12:22	23.905	10.8	0.5	116.68	476
06/28/16	12:23	23.904	10.8	0.5	116.74	477
06/28/16	12:24	23.904	10.8	0.5	116.78	477

F = Unit Offline

E = Exceedance

M = Maintenance

T = Out Of Control

C = Calibration

S = Substituted

* = Suspect

Average Data

Plant: HUNTINGTON PLANT

Interval: 1 Minute

Type: Block

Report Period: 06/28/2016 10:22 Through 06/28/2016 12:30

Time Online Criteria: 1 minute(s)

06/28/16	12:25	23.904	10.8	0.5	116.61	477
06/28/16	12:26	23.903	10.8	0.5	116.51	478
06/28/16	12:27	23.903	10.8	0.5	116.43	478
06/28/16	12:28	23.902	10.8	0.5	116.39	477
06/28/16	12:29	23.901	10.7	0.5	116.58	477
06/28/16	12:30	23.900	10.7	0.5	116.48	475

Average	23.918	10.9	0.5	116.42	477
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Minimum	23.900	10.6	0.5	115.76	467
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Maximum	23.926	11.2	0.6	117.16	487
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Summation	3,085.454	1,404.1	64.8	15,018.29	61,480
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Included Data Points	129	129	129	129	129
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Total number of Data Points	129	129	129	129	129
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F = Unit Offline

E = Exceedance

M = Maintenance

T = Out Of Control

Report Generated 07/01/2016 07:11 Huntington 1 Q2 PM

C = Calibration

S = Substituted

*** = Suspect**



Project PC16-0001.9

Appendix E: Calibration Information

Dry Gas Meter Pre-Test and Post-Test Calibrations

Critical Orifice Calibration Certificate

AETB Certification



Environmental Supply Company, Inc.

Quality Source Sampling Systems & Accessories

DRY GAS METER CALIBRATION REPORT

Customer:

Date: June 8, 2012Console Serial # 1938Console Model # C-5000 SLDGM Model # S-275 DGM SN # 17176782 Reference Meter S/N 554840Barometric Pressure, P_b : 29.53 in. Hg Tested at: 0 in. Hg - VacuumStandard Pressure : 29.92 in. Hg Standard Temperature : 528 °R

	1	2	3	Units
Orifice Manometer Setting, ΔH	2.00	0.75	6.00	in. H_2O
Elapsed Time	14	22	8	min.

Reference Meter

Final Volume Reading	702.229	713.510	725.165	ft³
Initial Volume Reading	691.001	702.623	714.124	ft³
Total Gas Volume, V_w	11.228	10.887	11.041	ft³
Temperature, Initial	75.3	75.2	74.9	°F
Temperature, Final	75.2	74.9	74.3	°F
Avg Temperature, T_w	75.3	75.1	74.6	°F

Dry Gas Meter

Final Volume Reading	49.378	60.658	72.151	ft³
Initial Volume Reading	38.220	49.777	61.246	ft³
Total Gas Volume, V_m	11.158	10.881	10.905	ft³
Average Temperature, Initial	78.0	77.5	77.0	°F
Average Temperature, Final	77.9	77.0	76.9	°F
Avg Temperature, T_m	77.9	77.2	76.9	°F
ΔH (a)	1.7947	1.7687	1.8171	Avg. ΔH (a) 1.7935
ΔH (a) Tolerance Check	OK	OK	OK	
Gamma, Y	1.0043	1.0007	0.9999	Avg. Y 1.0016
Gamma Tolerance Check	OK	OK	OK	

Calibration Performed By:

$$\Delta H_{(a)} = \frac{0.0319 \Delta H}{P_b (T_m + 460)} \left[\frac{(T_w + 460) \theta}{V_w} \right]^2$$

$$Y = \frac{V_w P_b (T_m + 460)}{V_m (P_b + \Delta H / 13.6)(T_w + 460)}$$

METHOD 5 DRY GAS METER CALIBRATION USING CRITICAL ORIFICES



EMISSIONS MEASUREMENT COMPANY

EMCO

ENVIRONMENTAL SUPPLY COMPANY

DATE:	6/30/2016	METER SERIAL #:	17176782
METER ID #:	N5-4	Critical Orifice Set Serial #:	1531s

ORIFICE #	RUN #	K' FACTOR	TESTED VACUUM (in Hg)	DGM READINGS (F°)	AMBIENT	DGM INLET	DGM OUTLET	DGM AVG	
ORIFICE #		RUN #		INITIAL	FINAL	NET (V _m)	INITIAL	FINAL	INITIAL
18	1	0.5004	18	534.321	537.530	3.209	70	66	67
	2	0.5004	18	537.530	540.740	3.210	70	68	69
	3	0.5004	18	540.740	544.008	3.268	70	69	70
23	1	0.6363	17	544.008	548.131	4.123	70	70	71
	2	0.6363	17	548.131	553.085	4.954	70	71	75
16	1	0.4381	18	553.085	556.0	2.915	70	73	73
	2	0.4381	18	556.0	558.916	2.916	70	73	73

INITIAL BAROMETRIC PRESSURE (in Hg): **24.62**

FINAL **24.62**

Avg (P_{bav})

ORIFICE #	RUN #	K' FACTOR	TESTED VACUUM (in Hg)	DGM READINGS (F°)	TEMPERATURES °F			ELAPSED TIME (MIN) θ	DGM ΔH (in H ₂ O)	V _m (STD)	V _{cr} (STD)	(3) Y	(2) Y	(1) Y	Y % Diff to Average Y	Y % Diff with other orifices	ΔH @
					INITIAL	FINAL	NET (V _m)										
18	1	0.5004	18	537.530	3.209	70	66	67	66.5	66.5	5.00	1.1	2.6573	2.6765	.007	1.79	
	2	0.5004	18	540.740	3.210	70	68	69	68	68	5.00	1.1	2.6306	2.6765	.010	1.78	
	3	0.5004	18	544.008	3.268	70	69	70	69	71.75	5.00	1.1	2.6794	2.6765	.999	1.77	
23	1	0.6363	17	548.131	4.123	70	70	71	69	70	5.00	1.7	3.3976	3.4034	.002	1.70	
	2	0.6363	17	553.085	4.954	70	71	75	70	77	6.00	1.7	4.0575	4.0840	.007	1.69	
16	1	0.4381	18	556.0	556.0	2.915	70	73	73	71	72	5.00	0.82	2.3433	2.3433	.982	1.72
	2	0.4381	18	558.916	558.916	2.916	70	73	73	71	72	5.00	0.82	2.3433	2.3433	.982	1.72

USING THE CRITICAL ORIFICES AS CALIBRATION STANDARDS:

The following equations are used to calculate the standard volumes of air passed through the DGM, V_m(std), and the critical orifice, V_{cr}(std), and the DGM calibration factor, Y. These equations are automatically calculated in the spreadsheet above.

AVERAGE DRY GAS METER CALIBRATION FACTOR, Y = **0.9971**

INITIAL DRY GAS METER CALIBRATION FACTOR, Y = **1.0016**

% DIFFERENCE = **0.45%** (Must be <5%)

AVERAGE AH@ = **1.74**

= Net volume of gas sample passed through DGM, corrected to standard conditions

K₁ = 17.64 (in. Hg (English), 0.3858 °K/mm Hg (Metric))

T_m = Absolute DGM avg. temperature (°R - English, °K - Metric)

= Volume of gas sample passed through the critical orifice, corrected to standard conditions

T_{cr} = Absolute ambient temperature (°R - English, °K - Metric)

K = Average K' factor from Critical Orifice Calibration

Y = DGM calibration factor

$$(1) \quad Vm_{(std)} = K_1 * Vm * \frac{Pbar + (\Delta H / 13.6)}{Tm}$$

$$(2) \quad Vcr_{(std)} = K * \frac{Pbar * \Theta}{\sqrt{Tamb}}$$

$$(3) \quad Y = \frac{Vcr_{(std)}}{Vm_{(std)}}$$

40 CFR Part 60, Appendix A-2 Method 2 §10.3: Temperature Sensors. After each fielduse, calibrate thermocouples at a temperature within 10% of the average absolute stack temperature. A reference thermocouple and potentiometer (calibrated against NIST standards) may be used. The absolute temperature measured with the sensor being calibrated and the reference sensor must agree within 1.5%.

Thermocouple Calibration (using NIST-Traceable PIE Model 520 Calibrator)

Reference Value: **250**

Console Value: **253**

Percent Difference: **1.2%**

Acceptance Criteria: **<1.5%**

PIE		Practical Instrument Electronics Tel: (860) 472-2000 • Fax: (860) 472-2658
CERTIFICATE OF CALIBRATION		
This is to certify that our instrument has been calibrated using standards whose accuracies are traceable to the National Institute of Standards and Technology (formerly NBS) within the terms of the NIST Calibration Services. Actual records pertaining to these standards are on file and are available for examination.		
Certified by: Practical Instrument Electronics Recommended Recalibration: Annually		
Model Number: 520-K	Serial No: S/N 107078	Calibration Date: 02-03-09
In Service Date: _____	Calibration Due: _____	Calibration Due: _____

METHOD 5 CRITICAL ORIFICE CALIBRATION



CRITICAL ORIFICE SET S/N: 1531s

DATE: January 8, 2016

REFERENCE DRY GAS METER
SERIAL NUMBER: 16300942
CALIBRATION FACTOR, Yc: 0.991

LEAK CHECK: Passed

ORIFICE #	RUN #	Barometric Pressure per Orifice AVG (Pa _{bar})		DGM READINGS (FT)		TEMPERATURES °F		DGM	DGM AH (in H ₂ O)	K' FACTOR (english)	K' FACTOR (metric-liters)	K' FACTOR VARIATION (%)
		Critical Vacuum	Tested Vacuum	Initial	Final	DGM INLET	DGM OUTLET					
31	1	15	17.5	67.132	73.855	6.723	70.9	74.3	74.3	74.35	6.00	-0.04
	2	15	17.5	73.855	80.552	6.727	70.9	74.3	74.1	74.3	74.25	4.12
23	1	15	18	80.582	86.457	5.875	71.0	74.2	74.0	74.3	74.20	4.12
	2	15	18	86.457	92.331	5.874	70.9	74.0	73.9	74.3	74.13	6.04
18	1	15	18	92.331	97.558	5.257	71.0	74.1	74.1	74.4	74.25	2.29
	2	15	18	97.558	102.850	5.262	70.9	74.0	74.0	74.4	74.20	2.29
16	1	15	18	102.850	108.733	5.883	71.1	74.1	74.1	74.5	74.30	1.44
	2	15	18	108.733	114.613	5.880	71.1	74.1	74.1	74.5	74.30	1.44
12	1	15	18	114.613	119.720	5.107	71.1	74.0	73.8	74.5	74.20	1.44
	2	15	18	119.720	124.833	5.113	71.1	73.8	74.1	74.5	74.20	1.44

USING THE CRITICAL ORIFICES AS CALIBRATION STANDARDS:
Calculate the standard volumes of air passed through the DGM and the critical orifices, and calculate the DGM calibration factor, Y, using the equations in US EPA Method 5.

Section 7.2.3 (these equations are programmed on the spreadsheet included with each orifice set).

Critical Orifice Set number 1531s was calibrated in accordance with the Code of Federal Regulations, Title 40, Part 60, Appendix A, Method 5, Section 7.2.

K' = Critical orifice coefficient,

$$[(ft^3)(°R)^{1/2})]/[(in.Hg)(min.)] - English Units$$

$$[(liters)(°K)^{1/2})]/[(mm Hg)(min.)] - Metric-Liters Units$$

$$[(m^3)(°K)^{1/2})]/[(mm Hg)(min.)] - Metric Units$$

John B. L.
Signature
Date

RE: Certification of Air Emission Testing Body (AETB) Conformance

To Whom it May Concern:

This letter is to confirm that Emissions Measurement Company LLC ("EMCo") is an Air Emission Testing Body (AETB) operating in conformance with ASTM D7036-04, as required by 40 CFR Part 75, Appendix A §6.1.2. The table below lists the EPA Reference Methods for which each listed Project Manager is a Qualified Individual and other relevant information required by (as applicable) 40 CFR Part 75.59(a)(15), 40 CFR Part 75.59(b)(6) and 40 CFR Part 75.59(d)(4).

Emissions Measurement Company (800) 984-9883					
AETB Qualified Individual Information					
QI Name	QI Email	Exam*	Exam Date	Exam Provider	Provider Email
Andrew Bruning	abruning@stacktest.us	SES Group 1	6/12/2014	SES	QSTIprogram@gmail.com
		SES Group 2	9/18/2015		
Mike Corrigan	mcorrigan@stacktest.us	SES Group 3	6/12/2015	Ohio-Lumex	andrew.mertz@ohiolumex.com
		EPA Method 30B	1/16/2015*		
Craig Kormylo	ckormylo@stacktest.us	SES Group 1	4/1/2015	SES	QSTIprogram@gmail.com
Matthew Parks	mparks@stacktest.us	SES Group 3	2/5/2016	Ohio-Lumex	andrew.mertz@ohiolumex.com
		EPA Method 30B	1/16/2015*		
*The Source Evaluation Society (SES) Group 1 Exam includes EPA Reference Methods 1, 1A, 2, 2A, 2C, 2D, 2F, 2G, 2H, 3, 3B, 4, 5, 5A, 5B, 5D, 5E, 5F, 5I, 17, 19, 201A and 202. The SES Group 2 Exam includes EPA Reference Methods 1, 2, 3, 4, 3B, 6, 6A, 6B, 7, 7C, 7D, 8, 11, 13A, 13B, 15A, 16A, 19, 26, 26A and 202. The SES Group 3 Exam includes EPA Reference Methods 3A, 6C, 7E, 10, 10B, 20, 25A, 40 CFR Part 60 Performance Specifications 2 – 8, 15 and <u>40 CFR Part 75</u> . Initial 30B training provided by Ohio-Lumex; refresher exam administered by EMCo once every five years.					

Please feel free to contact me with any questions regarding the above.



Matthew Parks
Technical Director